WHAT IS CLAIMED IS:

1. A combinatorial complex carbohydrate library comprising a plurality of addressable complex carbohydrate structures.

2. The combinatorial complex carbohydrate library of claim 1, wherein each of said addressable complex carbohydrate structures is attached to a solid support.

3. The combinatorial complex carbohydrate library of claim 2, wherein attaching each of said addressable complex carbohydrate structures to said solid support is effected by a linker.

4. The combinatorial complex carbohydrate library of claim 3, wherein the linker is cleavable.

5. The combinatorial complex carbohydrate library of claim 4, wherein the linker is cleavable under conditions that are harmless to carbohydrates.

6. The combinatorial complex carbohydrate library of claim 4, wherein the linker is selected so as to allow attaching thereto a p-Nitrophenyl, amine or squaric acid derivative of a sugar.

7. The combinatorial complex carbohydrate library of claim 3, wherein said linker includes at least two contiguous covalent bonds.

8. The combinatorial complex carbohydrate library of claim 3, wherein said linker is selected from the group consisting of an amino acid, a

peptide, a non-glycosylated protein, a lipid, a ceramide, dolicol phosphate, a cyclodextrin, an oligosaccharide, a monosaccharide, an alkyl chain and a nucleic acid.

9. The combinatorial complex carbohydrate library of claim 3, wherein said linker is of a length of at least 20 Angstrom.

10. The combinatorial complex carbohydrate library of claim 2, wherein said solid support is selected from the group consisting of addressable microparticles, addressable beads, addressable multi-block and a flat platform.

11. The combinatorial complex carbohydrate library of claim 10, wherein said flat platform is selected from the group consisting of a microtiterplate, a membrane and a chip.

12. The combinatorial complex carbohydrate library of claim 11, wherein said microtiterplate is an addressable microfabricated array of closed reaction chambers supplemented with micro-fluid systems.

13. The combinatorial complex carbohydrate library of claim 12, wherein said closed reaction chambers are arranged at a density of 4-25 per square cm.

14. The combinatorial complex carbohydrate library of claim 12, wherein each of said closed reaction chambers is of 50-1000 nanoliter in volume.

15. The combinatorial complex carbohydrate library of claim 2, wherein said solid support is a chip and further wherein different complex carbohydrate structures of said plurality of addressable complex carbohydrate

structures are arrange in patches spaced not more than 2.25 mm from one another center to center.

16. The combinatorial complex carbohydrate library of claim 2, wherein said solid support is of a substance selected from the group consisting of polysterene cross-linked with divinylbenzene, polyethylene glycol-polystyrene block copolymer, polyamides, polyacrylamide, polymethacrylamide, silica, glass, quartz, plastic and cellulose.

17. The combinatorial complex carbohydrate library of claim 1, wherein at least one of said plurality of addressable complex carbohydrate structures includes at least two contiguous saccharide units of a single species.

18. The combinatorial complex carbohydrate library of claim 1, wherein at least one of said plurality of addressable complex carbohydrate structures includes at least one branch.

19. The combinatorial complex carbohydrate library of claim 18, wherein at least one of said at least one branch is formed of identical core and branching saccharide units.

20. The combinatorial complex carbohydrate library of claim 1, wherein at least one of said plurality of addressable complex carbohydrate structures includes at least 4 saccharide units.

21. The combinatorial complex carbohydrate library of claim 1, wherein at least one of said plurality of addressable complex carbohydrate structures includes at least 5 saccharide units.

22. The combinatorial complex carbohydrate library of claim 1, wherein at least one of said plurality of addressable complex carbohydrate structures includes at least 6 saccharide units.

23. The combinatorial complex carbohydrate library of claim 1, wherein at least one of said plurality of addressable complex carbohydrate structures includes at least 7 saccharide units.

24. The combinatorial complex carbohydrate library of claim 1, wherein said plurality of addressable complex carbohydrate structures are a representation including non-natural complex carbohydrates.

25. The combinatorial complex carbohydrate library of claim 1, wherein said plurality of addressable complex carbohydrate structures are a representation including natural complex carbohydrates.

26. The combinatorial complex carbohydrate library of claim 25, wherein said natural complex carbohydrates are derived from a human source.

27. The combinatorial complex carbohydrate library of claim 26, wherein said human source is selected from the group consisting of a tissue, cells and body fluids.

28. The combinatorial complex carbohydrate library of claim 1, wherein said plurality of addressable complex carbohydrate structures are a representation of domains of at least one natural complex carbohydrate.

29. The combinatorial complex carbohydrate library of claim 28, wherein said at least one natural complex carbohydrate is derived from a human source.

30. A method of producing an addressable combinatorial complex carbohydrate library, the method comprising the steps of:

(a) providing a solid support having a plurality of locations; and

(b) enzymatically synthesizing a plurality of complex carbohydrate structures, each of said plurality of complex carbohydrate structures being attached to at least one addressed location of said plurality of locations, thereby producing the addressable combinatorial complex carbohydrate library.

31. The method claim 30, wherein attaching each of said plurality of complex carbohydrate structures to said solid support is effected by a linker.

32. The method of claim 31, wherein said linker includes at least two contiguous covalent bonds.

33. The method of claim 32, wherein the linker is cleavable.

34. The method of claim 33, wherein the linker is cleavable under conditions that are harmless to carbohydrates.

35. The method of claim 33, wherein the linker is selected so as to allow attaching thereto a p-Nitrophenyl, amine or squaric acid derivative of a sugar.

36. The method of claim 31, wherein said linker is selected from the group consisting of an amino acid, a peptide, a non-glycosylated protein, a lipid, a ceramide, dolicol phosphate, a cyclodextrin, an oligosaccharide, a monosaccharide, an alkyl chain and a nucleic acid.

37. The method of claim 31, wherein said linker is of a length of at least 20 Angstrom.

38. The method of claim 30, wherein said solid support is selected from the group consisting of addressable microparticles, addressable beads and a flat platform.

39. The method of claim 38, wherein said flat platform is selected from the group consisting of a microtiterplate, a membrane and a chip.

40. The method of claim 30, wherein said solid support is a chip and further wherein adjacent locations of said plurality of locations are spaced no more than 2.25 mm from one another.

41. The method of claim 39, wherein said microtiterplate is an addressable microfabricated array of closed reaction chambers supplemented with micro-fluid systems.

42. The method of claim 41, wherein said closed reaction chambers are arranged at a density of 4-25 per square cm.

43. The method of claim 41, wherein each of said closed reaction chambers is of 50-1000 nanoliter in volume.

44. The method of claim 30, wherein said solid support is of a substance selected from the group consisting of polysterene cross-linked with divinylbenzene, polyethylene glycol-polystyrene block copolymer, polyamides, polyacrylamide, polymethacrylamide, silica, glass, quartz, plastic and cellulose.

45. The method of claim 30, wherein at least one of said plurality of complex carbohydrate structures includes at least two contiguous saccharide units of a single species.

46. The method of claim 30, wherein at least one of said plurality of complex carbohydrate structures includes at least one branch.

47. The method of claim 46, wherein at least one of said at least one branch is formed of identical core and branching saccharide units.

48. The method of claim 30, wherein at least one of said plurality of complex carbohydrate structures includes at least 4 saccharide units.

49. The method of claim 30, wherein at least one of said plurality of complex carbohydrate structures includes at least 5 saccharide units.

50. The method of claim 30, wherein at least one of said plurality of complex carbohydrate structures includes at least 6 saccharide units.

51. The method of claim 30, wherein at least one of said plurality of complex carbohydrate structures includes at least 7 saccharide units.

52. The method of claim 30, wherein said plurality of complex carbohydrate structures are a representation including non-natural complex carbohydrates.

53. The method of claim 30, wherein said plurality of complex carbohydrate structures are a representation including natural complex carbohydrates.

54. The method of claim 53, wherein said natural complex carbohydrates are associated with a condition selected from the group consisting of tumorogenesis, metastasis, pregnancy, vascular disease, heart disease, neurodegenerative disease, autoimmune disease, infertility, allergies, embriogenesis, apoptosis, neurodegenerative disorders and organ transplantation.

55. The method of claim 53, wherein said natural complex carbohydrates are derived from a human source.

56. The method of claim 55, wherein said human source is selected from the group consisting of a tissue, cells and body fluids.

57. The method of claim 30, wherein said plurality of complex carbohydrate structures are a representation of domains of at least one natural complex carbohydrate.

58. The method of claim 57, wherein said at least one natural complex carbohydrate is derived from a human source.

59. A method of identifying a complex carbohydrate capable of binding an entity, the method comprising the steps of:

(a) producing an addressable combinatorial complex carbohydrate library by:

(i) providing a solid support having a plurality of locations; and

(ii) enzymatically synthesizing a plurality of complex carbohydrate structures, each of said plurality of complex carbohydrate structures being attached to at least one

addressed location of said plurality of locations, thereby producing the addressable combinatorial complex carbohydrate library; and

(b) screening said addressable combinatorial complex carbohydrate library with the entity for identifying the complex carbohydrate capable of binding the entity.

60. The method of claim 59, wherein said entity is selected from the group consisting of proteins encoded by an EST library, and proteins extracted from a natural source.

61. The method of claim 59, wherein the entity is a candidate for a biologically active material, the method serves for identifying a complex carbohydrate which is a target for said candidate for a biologically active material.

62. The method of claim 59, wherein the entity is a ligand known to bind a specific natural complex carbohydrate and further wherein said addressable combinatorial complex carbohydrate library is a representation of domains of said specific natural complex carbohydrate, the method serves for identifying a specific domain of said domains which binds said ligand.

63. A method of diagnosing a disorder by self or non-self complex carbohydrate structures and elicitation of antibodies thereagainst, the method comprising the steps of:

(a) producing an addressable combinatorial complex carbohydrate library representing the self or non-self complex carbohydrates by:

(i) providing a solid support having a plurality of locations; and

(ii) enzymatically synthesizing a plurality of complex carbohydrate structures, each of said plurality of complex carbohydrate structures being attached to at least one addressed location of said plurality of locations, thereby producing the addressable combinatorial complex carbohydrate library; and

(b) reacting said addressable combinatorial complex carbohydrate library with antibodies derived from a patient suspected of having the disorder to thereby generate a pattern of said locations to which said antibodies bind, such that by comparing said pattern with a known pattern characterizing a healthy individual, a diagnosis of said disorder is obtainable.